

The following Listing of Claims will replace all prior versions, and listings, of claims in the application.

LISTING OF CLAIMS:

1. (Currently Amended) ~~A power module for~~ An AC/AC power conversion converter configured to be mounted on a substrate, the AC/AC power converter comprising:
a plurality of input ends;
a plurality of output ends;
first and second direct-current power lines;
a multiple-phase converter components including a multiple phase converter, multiple smoothing condensers, and multiple inverter components including a multiple phase inverter configured to be mounted on a substrate which has been formed required wirings;
a first diode having its anode connected to one of said input ends and its cathode connected to said first direct-current power line,
a second diode having its anode connected to said second direct-current power line and its cathode connected to said one of said input ends connected to the anode of said first diode, and
a switching part selectively connecting another one of said input ends to either said first direct-current power line or said second direct-current power line;
at least a part of the converter components, at least a part of the smoothing condensers, and at least a part of the inverter components complying with required specification of the power module are mounted on the substrate, and having a required jumper
at least one smoothing capacitor connected between said first direct-current power line and said second direct-current power line; and
a multiple-phase inverter connected between said first and second direct-current power lines and said plurality of output ends.
2. (Currently Amended) ~~A power module~~ The AC/AC power converter as set forth in claim 1, wherein

said multiple-phase converter is a three phase converter is employed as the multiple phase converter,

the number of said smoothing condensers capacitor includes two smoothing capacitors is determined to be 2, and a three phase inverter is employed as the multiple phase inverter

said multiple-phase inverter is a three-phase inverter.

3. (Currently Amended) ~~A power module~~ The AC/AC power converter as set forth in claim 2 1, wherein

~~the three phase converter comprises a pair of transistors serially connected to one another for each phase, and diodes each connected in parallel to each transistor, at least a part of diodes and/or at least a part of transistors and diodes complying with the required specification of the power module mounted on the substrate, and having the required jumper~~

said smoothing capacitor includes two smoothing capacitors connected in series between said first direct-current power line and said second direct-current power line, and

said switching part includes

a third diode having its cathode connected to said first direct-current power line;

a fourth diode having its anode connected to said second direct-current power line;

a transistor connected between cathode of said third diode and anode of said fourth diode; and

a diode bridge establishing a connection of said another one of said plurality of input ends, a point between said two smoothing capacitors, and the emitter and collector of said transistor.

4. (Currently Amended) ~~A power module~~ The AC/AC power converter as set forth in claim 2 3, wherein

~~the three phase converter comprises a pair of transistors serially connected to one another for each phase, and diodes each connected in parallel to each of the transistors, at least a part of diodes and/or at least a part of transistors and diodes complying with the required specification of the power module are mounted on the substrate, and having the required jumper~~ the point between said two smoothing capacitors and one of said plurality of output ends are connected.

5. (Currently Amended) ~~A power module~~ The AC/AC power converter as set forth in claim 2 1, wherein

~~the three phase converter comprises transistors serially connected to one another and a pair of first diodes reversely connected for each phase, and a diode bridge having a pair of connection points opposing to one another, each of the connection points being connected to the emitter terminal of the transistor and the collector terminal of the transistor, and having another pair of connection points which are determined to be input and output points, and at least a part of transistors, the diode bridge, and the first diodes complying with the required specification of the power module are mounted on the substrate, and having the required jumper~~ said one of said plurality of output ends and said another one of said plurality of input ends are connected.

6. (Currently Amended) ~~A power module~~ The AC/AC power converter as set forth in claim 2 1, wherein

~~the three phase converter comprises transistors serially connected to one another and a pair of first diodes reversely connected for each phase, and a diode bridge having a pair of connection points opposing to one another, each of the connection points being connected to the emitter terminal of the transistor and the collector terminal of the transistor, and having another pair of connection points which are determined to be input and output points, and only at least a part of first diodes complying with the required specification of the power module are mounted on the substrate, and having the required jumper~~ said switching part includes

a third diode having its cathode connected to said first direct-current power line;
a fourth diode having its anode connected to said second direct-current power line;
a transistor connected between cathode of said third diode and anode of said fourth diode;
a fifth diode having its anode connected to said another one of said plurality of input ends and its cathode connected between the cathode of said fourth diode and said transistor; and

a sixth diode having its anode connected between the anode of said third diode and said transistor, and its cathode connected to said another one of said plurality of input ends.

7. (Currently Amended) ~~A power module~~ The AC/AC power converter as set forth in claim 2, ~~wherein 6 further comprising~~

~~the three phase converter comprises transistors serially connected to one another and a pair of first diodes reversely connected for each phase, and a diode bridge having a pair of connection points opposing to one another, each of the connection points being connected to the emitter terminal of the transistor and the collector terminal of the transistor, and having another pair of connection points which are determined to be input and output points, and at least a part of transistors and the diode bridge complying with the required specification of the power module are mounted on the substrate, and at least a part of first diodes complying with the required specification of the power module are mounted on the substrate, and having the required jumper~~ a reactor connected between said first direct-current power line and said second direct-current power line; and

a seventh diode provided on said first direct-current power line and having its anode connected to said smoothing capacitor and its cathode connected to said reactor.

8. (Currently Amended) ~~A power module~~ The AC/AC power converter as set forth in claim 2, ~~wherein 6, further comprising~~

~~the three phase converter comprises transistors serially connected to one another and a pair of first diodes forwardly connected for each phase, and pairs of second diodes each reversely connected between the emitter terminal of the transistor and the collector terminal of the transistor, each pair of second diodes being serially connected to one another, and at least a part of transistors and second diodes complying with the required specification of the power module are mounted on the substrate, and at least a part of first diodes complying with the required specification of the power module are mounted on the substrate, and having the required jumper~~ a seventh diode having its anode connected to said second direct-current power line and its cathode connected to said first direct-current power line; and

a reactor provided on said first direct-current power line and connected between said seventh diode and said smoothing capacitor.

9. (Currently Amended) ~~A power module~~ The AC/AC power converter as set forth in claim 2 1, wherein

~~the three phase converter comprises transistors serially connected to one another and a pair of first diodes forwardly connected for each phase, and pairs of second diodes each reversely connected between the emitter terminal of the transistor and the collector terminal of the transistor, each pair of second diodes being serially connected to one another, and only at least a part of first diodes complying with the required specification of the power module are mounted on the substrate, and having the required jumper~~ said smoothing capacitor is connected outside on said substrate.

10. (Currently Amended) ~~A power module as set forth in claim 3, wherein~~ substrate comprising:

~~only at least a part of diodes are mounted on the substrate, and a reactor is connected outside of the exterior between the converter and the smoothing condenser~~ a plurality of input ends, between any two of which an alternating voltage is applied;

a plurality of output ends;

first and second direct-current power lines;

a first region permitting mounting of any one of a plurality of kinds of first surface-mount devices that selectively establish electrical continuity between one of said plurality of input ends and either said first or said second direct-current power line; and

a second region permitting mounting of a second surface-mount device that selectively establish electrical continuity between one of said plurality of output ends and either said first or said second direct-current power line.

11. (Currently Amended) ~~A power module~~ The substrate as set forth in claim 9, wherein 10, further comprising

~~only at least a part of first diodes are mounted on the substrate, and a reactor is eennected outside of the exterior between the converter and the smoothing condenser~~ a first terminal provided on said first direct-current power line;

a second terminal provided on said second direct-current power line; and

a third terminal provided between said first terminal and said second terminal,
wherein

a smoothing capacitor is connected at least either between said first terminal and said
third terminal or between said second terminal and said third terminal, and

a jumper is connected between any of said terminals between which said smoothing
capacitor is not connected.

12. (Currently Amended) ~~A power module~~ The substrate as set forth in claim
8 11, wherein

~~a reactor is connected in parallel to the converter, and a third diode is reversely~~
~~connected between the reactor and the smoothing condenser~~ said smoothing capacitor is
connected outside.

13. (Currently Amended) ~~A power module~~ The substrate as set forth in claim
8 10, wherein

~~a fourth diode is forwardly connected in parallel to the converter, and a reactor is~~
~~connected between the fourth diode and the smoothing condenser~~ one of said plurality of
kinds of first surface-mount devices or said second surface-mount devices includes two
diodes connected in series between said first direct-current power line and said second
direct-current power line, with their anodes on the side of said second direct-current power
line and their cathodes on the side of said first direct-current power line.

14. (Currently Amended) The substrate as set forth in claim 11, wherein A
power module for AC/AC power conversion comprising:

~~multiple converter components including a multiple phase converter, and multiple~~
~~inverter components including a multiple phase inverter configured to be mounted on a~~
~~substrate which has been formed necessary wirings, at least a part of converter components,~~
~~at least a part of smoothing condensers, and at least a part of inverter components complying~~
~~with required specification of the power module are mounted on the substrate, and having~~
~~the required jumper~~ one of said plurality of kinds of first surface-mount devices or said
second surface-mount devices includes two diodes connected in series between said first
direct-current power line and said second direct-current power line, with their anodes on the

side of said second direct-current power line and their cathodes on the side of said first direct-current power line.

15. (Currently Amended) ~~A power module~~ The substrate as set forth in claim 14, further comprising 10, wherein

~~a junction to which a smoothing condenser is configured to be connected~~ one of said plurality of kinds of first surface-mount devices or said second surface-mount device includes two sets of a transistor and a diode that is connected in inverse-parallel to said transistor, said two sets connected in series between said first direct-current power line and said second direct-current power line.

16. (Currently Amended) ~~A power module~~ The substrate as set forth in claim 14, 11 wherein

~~a three-phase converter is employed as the multiple-phase converter which can be mounted on the substrate, and a three phase inverter is employed as the multiple phase inverter which is configured to be mounted on the substrate~~ one of said plurality of kinds of first surface-mount devices or said second surface-mount devices includes two sets of a transistor and a diode that is connected in inverse-parallel to said transistor, said two sets connected in series between said first direct-current power line and said second direct-current power line.

17. (Currently Amended) ~~A power module~~ The substrate as set forth in claim 14, wherein 10, further comprising:

~~a three-phase converter comprising a pair of transistors serially connected to one another for each phase, and diodes each connected in parallel to each transistor, is employed as the three-phase converter, and at least a part of diodes and/or at least a part of transistors and diodes complying with required specification of the power module are mounted on the substrate, and having the required jumper~~ two smoothing capacitors;

a first terminal provided on said first direct-current power line;

a second terminal provided on said second direct-current power line; and

a third terminal provided between said first terminal and said second terminal,

wherein

said two smoothing capacitors are provided between said first terminal and said third terminal and between said second terminal and said third terminal, and

one of said plurality of kinds of first surface-mount devices includes

a first diode having its cathode connected to said first direct-current power line,
a second diode having its anode connected to said second direct-current power line,
a transistor connected between cathode of said first diode and said anode of second diode, and
a diode bridge establishing a connection of a point between said first diode and said transistor, a point between said second diode and said transistor, one of said plurality of input ends, and a point between said two smoothing capacitors.

18. (Currently Amended) A power module The substrate as set forth in claim 14, ~~10~~ wherein

~~a three phase converter comprising a pair of transistors serially connected to one another for each phase, and diodes each connected in parallel to each transistor, is employed as the three phase inverter, and at least a part of transistors and diodes complying with required specification of the power module are mounted on the substrate, and having the required jumper~~ one of said plurality of kinds of first surface-mount devices includes

a first diode having its cathode connected to said first direct-current power line,
a second diode having its anode connected to said second direct-current power line,
a transistor connected between cathode of said first diode and said anode of second diode,
a third diode having its anode connected between said first diode and said transistor and its cathode connected to one of said plurality of input ends, and
a fourth diode having its anode connected to said one of said plurality of input ends and its cathode connected between said second diode and said transistor.

19. (Currently Amended) A power module The substrate as set forth in claim 14, wherein ~~10~~, further comprising

~~a three phase converter comprising transistors serially connected to one another and a pair of first diodes reversely connected for each phase, and a diode bridge having a pair of connection points opposing to one another, each of the connection points being connected to~~

~~the emitter terminal of the transistor and the collector terminal of the transistor, and having another pair of connection points which are determined to be input and output points, is employed as the three phase converter, and at least a part of transistors, the diode bridge, and the first diodes complying with the required specification of the power module are mounted on the substrate, and having the required jumper~~ two terminals connecting a reactor or a jumper on said first direct-current power line, wherein

said first direct-current power line is separated by said two terminals.

20-34. (Cancelled)